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(54) Impedance matched cable assembly

Impedanzangepasste Kabelbaugruppe

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Description

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention relates generally to electrical terminating connectors used in high speed data transmission, and more particularly to a terminating connector having improved impedance characteristics, an apparatus for transmitting electronic data therethrough and a method of constructing such apparatus.

BACKGROUND OF THE INVENTION

[0002] Transmission of high speed data can be achieved via discrete wire coaxial cables, having a signal carrying conductor and a shielding portion often realized by a foil, which is connected to a reference potential. A high-density modular oonnector as disclosed in EP 0 284 245 can be used for interconnection of such cables. EP 0 284 245 discloses a high density modular electrical connector with a signal contact for connection to the signal carrying conductor of the coaxial cable and a ground contact for connection to the shield of a coaxial cable. Both the signal contact and the ground contact are supported on opposite sides of a dielectric support. The dielectric support of the connector sufficiently electrically isolates both contacts from each other. Connecting the coaxial cable with another cable or a socket the connector fails to match the impedances of the elements to be connected.

[0003] However, when transmitting high speed data signals through a conductive transmission medium, the integrity of the received signals depends on the impedance over the signal path. In general, impedance mismatches in a transmission path cause signal reflection, which leads to signal losses such as reduction in signal amplitude, cancellation of certain signals, and so on. Accordingly, the more consistent the impedance over the path, the better the integrity of the received signal.

[0004] The wire portion of the conductive transmission medium, which, for example, may be a coaxial cable, provides a signal path having a very consistent characteristic impedance. Moreover, the physical construction of the wire allows the impedance to be selected, e.g., one cable may be constructed to have an impedance of 75 ohms, while another has an impedance of 50 ohms.

[0005] US patent 5,062,809 describes a high frequency connector having plate shaped ground and signal contacts, which are overmolded by a dielectric material forming a dielectric block. The impedance of the connector can be adjusted to a characteristic impedance of a particular coaxial cable connected with the connector. However, the isolation and characteristic impedance of this connector is strongly influenced by the coplanar arrangement of the different contacts.

[0006] However, the terminating connector that connects the signal-carrying wire to the next destination for the signal is not well controlled with respect to impedance, and typically varies from the cable's impedance by a substantial amount. In particular, in a standard two millimeter connector assembly, the impedance of the connector is notorious for being poorly matched with the controlled-impedance cable that the connector is terminating. This reduces the integrity of signals received therethrough, resulting, for example, in numerous transmission errors and/or limited bandwidth.

OBJECTS AND SUMMARY OF THE INVENTION

[0007] Accordingly, it is an object of the present invention to provide an apparatus and method that improves the integrity of signal transmission by improving the impedance match between an electrical terminating connector and a data transmission cable terminated thereby.

[0008] It is a related object to provide a terminating connector that substantially matches the impedance of the cable.

[0009] Another object is to provide a connector as characterized above that is compatible in size and shape with standardized connector specifications.

[0010] Yet another object is to provide an apparatus of the above kind that employs a relatively simple and economical manufacturing method, while providing a sturdy and reliable connector.

[0011] Briefly, the present invention provides an apparatus for terminating a data transmission cable and a method for constructing same. The cable is of a known characteristic impedance and is of the type having a signal carrying conductor and a shield. The apparatus is embodied in a connector comprising a subassembly, the subassembly including a first terminal arranged for electrically coupling at one end to the shield. A first contact is disposed at the opposite end of the terminal. The subassembly further includes a second terminal arranged for electrically coupling at one end to the signal carrying conductor, and has a second contact at an opposite end thereof. The subassembly is overmolded. A dielectric insert is disposed between the first and second terminals, the insert being dimensioned and having a selected dielectric constant to provide a characteristic impedance of the subassembly that substantially matches the characteristic impedance of the cable. A housing is provided, and has an interior region dimensioned to receive the subassembly from one end such that the first and second contacts are electrically accessible from an opposite end of the housing. The subassembly may be secured to the housing, such as by epoxy or the like.

[0012] Other objects and advantages will become apparent from the following detailed description when taken in conjunction with the drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0013]

FIGURE 1 is a side view illustrating a data transmission apparatus constructed according to the invention having a cable shown with terminating connectors at both ends thereof;
FIG. 2 is a top view of the apparatus of FIG. 1;
FIG. 3 is a partial cut-away, perspective view illustrating the terminating connector coupled to one end of a cable via a subassembly secured to a housing;
FIG. 4 is an end view illustrating apertures in the housing for providing electrical access to the terminals;
FIG. 5 is a side view of the terminating connector in partial cross-section showing the subassembly secured to the housing;
FIG. 6 is a top view representative of stamped terminal portions for constructing the connector;
FIG. 7 is a side view of FIG. 9;
FIG. 8 is an exploded view illustrating a method of constructing the subassembly components;
FIG. 9 is a representation of the terminals with a dielectric insert therebetween and coupled to the cable prior to overmolding into a completed subassembly;
FIG. 10 is a perspective view showing the subassembly prior to securing to the housing;
FIG. 11 is a side view similar to FIG. 1 illustrating an alternate data transmission apparatus having multiple signal-carrying conductors within the cable;
FIG. 12 is a top view of the apparatus of FIG. 11;
FIG. 13 is a partial cut-away, perspective view illustrating a terminating connector with multiple signal carrying conductors of FIGS. 11-12; and
FIG. 14 is an end view illustrating apertures in the housing for providing electrical access to the terminals of the connector of FIGS. 11-13.

[0014] While the invention is amenable to various modifications and alternative constructions, certain illustrated embodiments thereof are shown in the drawings and will be described below in detail. It should be understood, however, that there is no intention to limit the invention to the specific forms disclosed, but on the contrary, the intention is to cover all modifications, alternative constructions, and equivalents falling within the scope of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0015] Turning to the drawings and referring first to FIGS. 1 and 2, there is shown a cable 20 having an electrical terminating connector generally designated 22 at each end thereof constructed in accordance with the invention. As best shown in FIG. 8, the cable 20 is of the type having a shield 24 and a signal carrying conductor 26, and has a known characteristic impedance, e.g., 50 ohms. A dielectric layer 25 electrically insulates the shield 24 from the signal carrying conductor 26, and a dielectric sheath 27 covers the shield 24. Such cables are typically used in high speed data transmission such as in telecommunications applications or applications involving the transmission of computer signals.

[0016] As best shown in FIGS. 3, 5-and 10, the components of each connector are surrounded by a protective housing 28, the housing 28 adapted for plugging into a backplane assembly or the like (not shown). The housing 28 may be made from molded plastic or other suitable material. A mating end 30 of the housing 28 includes two openings 31, 33 (FIG. 4) providing access to first and second terminals 32, 34 of the connector 22, such that complementary terminals or the like of a backplane connector may mate therewith.

[0017] As best shown in FIG. 5, the first and second terminals 32, 34 are resilient at respective contact points 36, 38 thereof so as to be deflectable by such complementary terminals, thereby ensuring adequate electrical contact. As also shown, the other end 40 of the first terminal 32 is electrically coupled to the shield 24 while the other end 42 of the second terminal 34 is electrically coupled to the signal carrying conductor 26 of the cable.

[0018] In accordance with one aspect of the invention, as shown in FIGS. 3 and 5, the first and second terminals 32, 34 have a dielectric insert 44 sandwiched therebetween. The dielectric insert 44 is dimensioned and has a dielectric constant selected such that the impedance through the connector 22 substantially matches the impedance of the cable 20. The separation and area of the terminals adjacent the dielectric insert 44, along with the dielectric constant of the dielectric insert 44, influence the characteristic impedance by generally altering the connector capacitance, i.e., ($C = \varepsilon A / d$) where $\in$ is the dielectric constant, A is the area of the terminals and d is the separation between the terminals).

[0019] One material found suitable for the dielectric insert 44 is RT Duroid, wherein the connector 22 is constructed to terminate a 50 ohm impedance cable and is a two millimeter (.0787 ± .001 inches) type, i.e., as specified by the terminal separation W as shown in FIGS. 4 and 5. In such a connector, the thickness of the insert is .762 millimeters (.030 ± .001 inches). Other materials, including ceramics, have been found to provide desired impedances for this size connector, although ceramics are generally less durable. Of course, alternate materials are feasible, as determined by the desired impedance and the dimensions of the connector.

[0020] For structural purposes, the terminals 32, 34 and dielectric insert 44 are overmolded into a subassembly 46 as best shown in FIG. 10. The subassembly 46 is dimensioned such that it completely fits into the inner region 52 (FIG. 10) of the tubular dielectric housing

28. A recess 54 may be optionally formed in the subassembly 46 to facilitate proper insertion and particularly to serve as an indicator of proper polarity. The housing 28 is open at one end 56 (FIG. 10), and the subassembly 46 includes a wider end portion 58. The wider end portion 58 tightly, but slidably fits into the inner region 52 of the housing 28. A protrusion 60 (FIG. 5) or the like on the inner wall 62 of the housing may be provided, the protrusion 60 limiting the depth of insertion into the housing 28 from that end. As can be appreciated, this locates the terminals 32, 34 in the proper position (with respect to insertion depth) for making subsequent electrical contact.

[0021] To secure the sub-assembly 46 to the housing 28, the subassembly 46 is fastened to the housing 28 with an adhesive material such as epoxy 64. To facilitate the epoxying operation, the wider end portion 58 of the subassembly 46, which is only slightly smaller than the inner region of the housing 52, serves as a stop surface, preventing epoxy from reaching the contacts 36, 38 to ensure that electrical contact at the contact points is not impaired. The epoxy 64 further serves to strain relieve the connections between the terminals 32, 34 and the cable shield 24 and center signal conductor 26. Other suitable materials may include resins, polyurethanes, plastics and so on, and may be cured in any number of ways.

[0022] In general, a metered amount of liquid epoxy 64 is dispensed in a known manner to fill the rearwardmost space of the inner region 52 of the housing 28, and allowed to (or caused to) properly cure. Once cured, the housing 28 and subassembly 46 become a unitary, generally permanent, structure. Of course, other methods of securing the subassembly to the housing are feasible, such as described in copending U.S. Patent Application entitled "Impedance Matched Cable Assembly Having Latching Subassembly," Attorney Docket No. 96-039, assigned to the assignee and having the same inventors as named herein.

[0023] To construct the connector 22, the terminals 32, 34 are stamped, formed and trimmed from sheet metal 69 as generally shown in FIGS. 6 and 7. The terminals 32, 34 are also typically plated as desired. Such stamping, forming, trimming and plating operations are well understood, and are not discussed in detail herein. During assembly, the trimming is such that the two terminals 32, 34 remain temporarily connected to one another by a sheet metal tab 70, shown in FIGS 6 and 7 and in phantom in FIG. 8. Such a connection facilitates assembly by keeping the terminals 32, 34 aligned with one another at a desirable separation distance.

[0024] For simplicity, the connector 22 will be described from the perspective of having a forward end that plugs into a backplane, and a rearward end that is electrically coupled to the cable 20. Similarly, the prepared (stripped) end of the cable 21 may be considered the forward end of the cable, i.e., the forward end of the cable is electrically coupled to the rearward end of the connector 22. Of course, the forward and rearward terminology is arbitrary and does not limit the invention, as the apparatus may be oriented in any direction with signals being transmitted either or both directions therethrough.

[0025] As shown in FIG. 8, the forward end 21 of the cable 20 is prepared, i.e., stripped in a known manner, such that the center, signal carrying conductor 26 extends foremost, with a portion of its insulated layer 25 extending to a lesser distance to insulate the signal carrying conductor 26 from the stripped braided portion 24. The braided shield 24 is then electrically coupled, e.g., soldered or welded, to the rearward end of the first terminal 32, while the center, signal-carrying conductor 26 is electrically coupled, e.g., soldered or welded, to the second terminal 34. In the exemplified embodiment shown herein, the first terminal 32 is slightly bent for reaching the braided shield 24 to facilitate the soldering or welding. The second terminal 34 is relatively straigt and slightly shorter to accommodate the lengthier center conductor 26.

[0026] In another step, as represented in FIG. 8, the dielectric insert 44 is inserted between the terminals 32, 34. The resiliency and separation of the terminals may be such that the insert is held in place, however this is not necessary to the invention. When assembled, the tab 70 shown in phantom in FIG. 8 is removed, such that at this moment the connector generally appears as in FIG. 9. The terminals 32, 34, and insert 44 are then overmolded into the subassembly 46 shown in FIG. 10. Lastly, when cured, the subassembly 46 is inserted into the housing 28 wherein it is secured (e.g., epoxied) as described above.

[0027] Finally, as best shown in FIGS. 11-14, similar connectors 122 may be arranged for terminating cables 120 having multiple signal carrying conductors 126, 226. For simplicity, in FIGS. 11-14, like components performing like functions to those in FIGS. 1-10 are numbered exactly one-hundred higher than their numbered counterparts of FIGS. 1-10. Where necessary in FIGS. 11-14, when two such like components are provided instead of one, each of the second such components are numbered exactly two-hundred higher than their numbered counterparts in FIGS 1-10.

[0028] Thus, as shown in FIG. 13, the braided shield 124 may be coupled to common terminals 132, 232 for mating with a single complementary terminal of a suitable complementary backplane connector. To this end, wire-like leads 80, 82 or the like may be used to facilitate the connection, or the terminals 132, 232 may be slightly bent as described previously. Of course, the shield 124 may only be coupled to one of the two terminals, and only one such ground terminal may be actually necessary (e.g., terminal 132). Similarly, such a connector 122 may provide two separate terminals for contacting the shield, i.e., have four separate contact points.

[0029] In any event, the center conductors 126, 226 are electrically coupled to the terminals 134, 234, re-

spectively. A first dielectric insert 144 is inserted between terminals 132 and 134, while a second dielectric insert 244 is inserted between terminals 232 and 234. In the manner described above, the dielectric inserts 144, 244 and terminals 132, 232, 134 and 234 are overmolded into a subassembly 146. As before, the subassembly 146 is inserted into and secured to an appropriately-configured housing 128. As can be appreciated, the housing 128 provides as many openings 131, 133 and 233 as necessary to provide access to the multiple terminals.

[0030] As can be seen from the foregoing detailed description, there is provided an apparatus and method that improves the integrity of signal transmission by improving the impedance match between an electrical terminating connector and a data transmission cable terminated thereby. The terminating connector substantially matches the impedance of the cable, and the connector is compatible in size and shape with standardized connector specifications. The apparatus employs a relatively simple and economical manufacturing method, and provides a sturdy and reliable connector.

Claims

1. An electrical terminating connector (22) for a data transmission cable (20of a known characteristic impedance and of the type having a signal carrying conductor (26) and a shield (24), the connector (22) comprising, a subassembly (46) including a first terminal (32) arranged for electrically coupling at one end thereof to the shield (24) and having a first contact (36) at an opposite end thereof, a second terminal (34) arranged for electrically coupling at one end thereof to the signal carrying conductor (26) and having a second contact (38) at an opposite end thereof, and a dielectric insert (44) disposed between the first and second terminals (32, 34), and a housing (28), the housing (28) having an interior region (52) dimensioned to receive the subassembly (46) from one end of the housing (28) such that the first and second contacts (36, 38) are electrically accessible from an opposite end (30) of the housing (28), means being provided for securing the subassembly (46) to the housing (28)
characterized, in that

   the subassembly (46) is overmolded, and **in that**

   the dielectric insert (44) is dimensioned and having a selected dielectric constant to provide an impedance of the subassembly (46) that substantially matches the characteristic impedance of the cable (20) to be terminated by the connector.

2. The connector of claim 1 wherein at least part of the subassembly (46) is overmolded into a unitary structure.

3. The connector of claim 1 or 2 wherein the dielectric insert (44) comprises RT Duroid.

4. The connector of claim 1 or 2 wherein the dielectric insert (44) comprises ceramic material.

5. The connector of one of the claims 1 to 4 wherein the means (64) for securing the subassembly (46) to the housing (28) includes epoxy.

6. The connector of claim 5 wherein at least one portion (58) of the subassembly (46) is dimensioned to fit in the interior region (52) of the housing (28) such that said portion (58) impedes the flow of epoxy.

7. The connector of one of the claims 1 to 6 wherein the housing (28) includes means (60) for limiting depth of subassembly (46) insertion.

8. The connector of one of the claims 1 to 7 wherein the cable has a plurality of signal carrying conductors (126, 226), and the subassembly further comprising a third terminal (234) arranged for electrically coupling at one end thereof to a second signal carrying conductor (226) and having a third contact at an opposite end thereof.

9. An apparatus for transmitting electronic data therethrough, comprising:

   a transmission cable (20) of a known characteristic impedance, the cable (20) including a signal carrying conductor (26) and a shield (24); and
   an electrical terminating connector (22), the connector (22) comprising,

      a subassembly (46) including a first terminal (32) electrically coupled at one end to the shield (24) and having a first contact (36) at an opposite end thereof, a second terminal (34) electrically coupled at one end to the signal carrying conductor (26) and having a second contact (38) at an opposite end thereof, and a dielectric insert (44) disposed between the first and second terminal (32, 34); and
      a housing (28), the housing (28) having an interior region (52) dimensioned to receive the subassembly (46) from one end of the housing (28) such that the first and second contacts (36, 38) are electrically accessible from an opposite end of the housing (28); means (64) for securing the subassembly

(46) to the housing (28);

characterized in that

the subassembly is overmolded and

the dielectric insert (44) is dimensioned and having a selected dielectric constant to provide an impedance of the subassembly (46) that substantially matches the characteristic impedance of the cable (20).

10. The apparatus of claim 9 wherein at least part of the subassembly (46) is overmolded into a unitary structure.

11. The apparatus of claim 9 or 10 wherein the dielectric insert (44) comprises RT Duroid.

12. The apparatus of claim 9 or 10 wherein the dielectric insert (44) comprises ceramic material.

13. The apparatus of one of the claims 9 to 12 wherein the means (64) for securing the subassembly (46) to the housing (48) includes epoxy.

14. The apparatus of claim 13 wherein at least one portion (58) of the subassembly (46) is dimensioned to fit in the interior region (52) of the housing (28) such that said portion (58) impedes the flow of epoxy.

15. The apparatus of claim 13 wherein the epoxy surrounds a region wherein the first terminal (32) is electrically coupled at one end to the shield (24) and wherein the second terminal (34) is electrically coupled at one end to the signal carrying conductor (26).

16. The apparatus of one of the claims 9 to 15 wherein the housing (28) includes means (60) for limiting depth of subassembly (46) insertion.

17. The apparatus of one of the claims 9 to 16 wherein the cable has a plurality of signal carrying conductors (126, 226), the subassembly further comprising a third terminal (234) arranged for electrically coupling at one end thereof to a second signal carrying conductor (226) and having a third contact at an opposite end thereof.

18. A method of constructing an apparatus for transmitting electronic data therethrough, comprising the steps of, providing a transmission cable (20) of a known characteristic impedance, the cable (20) including a signal carrying conductor (26) and a shield (24), electrically coupling a first terminal (32) at one end thereof to the shield (24), electrically coupling a second terminal (34) at one end thereof to the signal carrying conductor (26), inserting a dielectric insert (44) between the first and second terminals (32, 34), overmolding at least part of the dielectric insert, (44), the end of the first terminal (32) coupled to the shield (24), and the end of the second terminal (34) coupled to the signal carrying conductor (26) into a subassembly, (46), and inserting the subassembly (46) into a housing (28),

securing the subassembly (46) to the housing (28), and

dimension the dielectric insert (44) and select the dielectric constant to provide an impedance of the subassembly (46) that substantially matches the characteristic impedance of the cable (20).

19. The method of claim 18 wherein the step of securing the subassembly (46) to the housing (28) includes the step of delivering an amount of epoxy (64) into the inner end portion of the housing (28).

20. The method of claim 18 or 19 wherein the cable has a plurality of signal carrying conductors (126, 226), and further comprising the step of electrically coupling a third terminal (234) at one end thereof to a second signal carrying conductor (226).

21. The method of claim 18 or 19 further comprising the step of stripping the cable (20) such that the signal carrying conductor (26) and shield (24) are exposed for electrically coupling to the respective terminals (32, 34).

22. The method of one of the claims 18 to 21 further comprising the steps of stamping and forming the first and second terminals (32, 34).

Patentansprüche

1. Elektrischer Abschlussverbinder (22) für ein Datenübertragungskabel (20) mit bekanntem Wellenwiderstand und von der Art, die einen signalführenden Leiter (26) und eine Abschirmung (24) aufweisen, wobei der Verbinder (22) eine Teilanordnung (46) umfasst, die einen ersten Anschluss (32) aufweist, der an seinem einen Ende zur elektrischen Verbindung mit der Abschirmung (24) angepasst ist und an seinem entgegengesetzten Ende einen ersten Kontakt (36) aufweist, einen zweiten Anschluss (34), der an seinem einen Ende zur elektrischen Verbindung mit dem signalführenden Leiter (26) angepasst ist und an seinem entgegengesetzten Ende einen zweiten Kontakt (38) aufweist, sowie einen dielektrischen Einsatz (44), der zwischen dem ersten und dem zweiten Anschluss (32, 34) angeordnet ist, und ein Gehäuse (28), wobei das Gehäuse (28) einen Innenbereich (52) aufweist, der so bemessen ist, dass er die Teilanordnung (46) von ei-

nem Ende des Gehäuses (28) aus in solcher Weise aufnimmt, dass der erste und der zweite Kontakt (36, 38) vom entgegengesetzten Ende (30) des Gehäuses (28) aus elektrisch zugänglich sind, wobei Mittel zur Befestigung der Teilanordnung (46) an dem Gehäuse (28) vorgesehen sind,

dadurch gekennzeichnet, dass

die Teilanordnung (46) übergossen ist, und dadurch, dass der dielektrische Einsatz (44) derartig bemessen ist und eine solche ausgewählte Dielektrizitätskonstante aufweist, dass eine Impedanz der Teilanordnung (46) gegeben ist, die im Wesentlichen an den Wellenwiderstand des Kabels (20), das durch den Verbinder abgeschlossen werden soll, angepasst ist.

2. Verbinder nach Anspruch 1, bei welchem zumindest ein Teil der Teilanordnung (46) zu einer einheitlichen Struktur übergossen ist.

3. Verbinder nach Anspruch 1 oder 2, bei welchem der dielektrische Einsatz (44) RT-Duroid umfasst.

4. Verbinder nach Anspruch 1 oder 2, bei welchem der dielektrische Einsatz (44) keramisches Material umfasst.

5. Verbinder nach einem der Ansprüche 1 bis 4, bei welchem das Mittel (64) zum Befestigen der Teilanordnung (46) an dem Gehäuse (28) Epoxidharz umfasst.

6. Verbinder nach Anspruch 5, bei welchem zumindest ein Abschnitt (58) der Teilanordnung (46) so bemessen ist, dass er derartig im Innenbereich (52) des Gehäuses (28) sitzt, dass dieser Abschnitt (58) den Fluss von Epoxidharz behindert.

7. Verbinder nach einem der Ansprüche 1 bis 6, bei welchem das Gehäuse (28) Mittel (60) zum Begrenzen der Einfügungstiefe der Teilanordnung (46) aufweist.

8. Verbinder nach einem der Ansprüche 1 bis 7, bei welchem das Kabel eine Mehrzahl von signalführenden Leitern (126, 226) aufweist und die Teilanordnung ferner einen dritten Anschluss (234) umfasst, der an seinem einen Ende zur elektrischen Verbindung mit einem zweiten signalführenden Leiter (226) angepasst ist und an seinem entgegengesetzten Ende einen dritten Kontakt aufweist.

9. Vorrichtung zur Übertragung elektronischer Daten durch selbige, umfassend:

ein Übertragungskabel (20) mit bekanntem Wellenwiderstand, wobei das Kabel (20) einen signalführenden Leiter (26) und eine Abschirmung (24) aufweist; sowie

einen elektrischen Abschlussverbinder (22), wobei der Verbinder (22) umfasst:

eine Teilanordnung (46), die einen ersten Anschluss (32) beinhaltet, der an einem Ende elektrisch mit der Abschirmung (24) verbunden ist und an seinem entgegengesetzten Ende einen ersten Kontakt (36) aufweist, einen zweiten Anschluss (34), der an einem Ende elektrisch mit dem signalführenden Leiter (26) verbunden ist und an seinem entgegengesetzten Ende einen zweiten Kontakt (38) aufweist, sowie einen dielektrischen Einsatz (44), der zwischen dem ersten und dem zweiten Anschluss (32, 34) angeordnet ist; und

ein Gehäuse (28), wobei das Gehäuse (28) einen Innenbereich (52) aufweist, der derartig bemessen ist, dass er die Teilanordnung (46) von einem Ende des Gehäuses (28) aus in solcher Weise aufnimmt, dass der erste und der zweite Kontakt (36, 38) von einem entgegengesetzten Ende des Gehäuses (28) aus elektrisch zugänglich sind, sowie Mittel (64) zum Befestigen der Teilanordnung (46) an dem Gehäuse (28);

dadurch gekennzeichnet, dass

die Teilanordnung übergossen ist, und dass der dielektrische Einsatz (44) so bemessen ist und eine solche ausgewählte Dielektrizitätskonstante aufweist, dass eine Impedanz der Teilanordnung (46) gegeben ist, die im Wesentlichen an den Wellenwiderstand des Kabels (20) angepasst ist.

10. Vorrichtung nach Anspruch 9, bei welcher zumindest ein Teil der Teilanordnung (46) zu einer einheitlichen Struktur übergossen ist.

11. Vorrichtung nach Anspruch 9 oder 10, bei welcher der dielektrische Einsatz (44) RT-Duroid umfasst.

12. Vorrichtung nach Anspruch 9 oder 10, bei welcher der dielektrische Einsatz (44) keramisches Material umfasst.

13. Vorrichtung nach einem der Ansprüche 9 bis 12, bei welcher das Mittel (64) zum Befestigen der Teilanordnung (46) an dem Gehäuse (28) Epoxidharz umfasst.

14. Vorrichtung nach Anspruch 13, bei welcher zumindest ein Abschnitt (58) der Teilanordnung (46) so bemessen ist, dass er derartig im Innenbereich (52) des Gehäuses (28) sitzt, dass dieser Abschnitt (58)

den Fluss von Epoxidharz behindert.

15. Vorrichtung nach Anspruch 13, bei welcher das Epoxidharz einen Bereich umgibt, in welchem der erste Anschluss (32) an einem Ende elektrisch mit der Abschirmung (24) verbunden ist und in welchem der zweite Anschluss (34) an einem Ende elektrisch mit dem signalführenden Leiter (26) verbunden ist.

16. Vorrichtung nach einem der Ansprüche 9 bis 15, bei welcher das Gehäuse (28) Mittel (60) zum Begrenzen der Einfügungstiefe der Teilanordnung (46) aufweist.

17. Vorrichtung nach einem der Ansprüche 9 bis 16, bei welcher das Kabel eine Mehrzahl von signalführenden Leitern (126, 226) aufweist, wobei die Teilanordnung ferner einen dritten Anschluss (234) umfasst, der an seinem einen Ende zur elektrischen Verbindung mit einem zweiten signalführenden Leiter (226) vorgesehen ist und an seinem entgegengesetzten Ende einen dritten Kontakt aufweist.

18. Verfahren zum Aufbau einer Vorrichtung zur Übertragung elektronischer Daten durch selbige, welches folgende Schritte umfasst:

Bereitstellen eines Übertragungskabels (20) mit einem bekannten Wellenwiderstand, wobei das Kabel (20) einen signalführenden Leiter (26) und eine Abschirmung (24) umfasst;
elektrisches Verbinden eines ersten Anschlusses (32) an dessen einem Ende mit der Abschirmung (24);
elektrisches Verbinden eines zweiten Anschlusses (34) an dessen einem Ende mit dem signalführenden Leiter (26);
Einfügen eines dielektrischen Einsatzes (44) zwischen dem ersten und dem zweiten Anschluss (32, 34);
Übergießen zumindest eines Teils des dielektrischen Einsatzes (44), des Endes des ersten Anschlusses (32), das mit der Abschirmung (24) verbunden ist, und des Endes des zweiten Anschlusses (34), das mit dem signalführenden Leiter (26) verbunden ist, zu einer Teilanordnung (46); und
Einfügen der Teilanordnung (46) in ein Gehäuse (28);
Befestigen der Teilanordnung (46) an dem Gehäuse (28) und
Bemessen des dielektrischen Einsatzes (44) und Auswählen der Dielektrizitätskonstante in solcher Weise, dass eine Impedanz der Teilanordnung (46) bereitgestellt wird, die im Wesentlichen an den Wellenwiderstand des Kabels (20) angepasst ist.

19. Verfahren nach Anspruch 18, bei welchem der Schritt des Befestigens der Teilanordnung (46) an dem Gehäuse (28) den Schritt des Zuführens einer Menge an Epoxidharz (64) in den inneren Endabschnitt des Gehäuses (28) beinhaltet.

20. Verfahren nach Anspruch 18 oder 19, bei welchem das Kabel eine Mehrzahl von signalführenden Leitern (126, 226) aufweist und das ferner den Schritt des elektrischen Verbindens eines dritten Anschlusses (234) an dessen einem Ende mit einem zweiten signalführenden Leiter (226) umfasst.

21. Verfahren nach Anspruch 18 oder 19, welches ferner den Schritt des Abisolierens des Kabels (20) in solcher Weise umfasst, dass der signalführende Leiter (26) und die Abschirmung (24) freigelegt werden, um elektrisch mit den jeweiligen Anschlüssen (32, 34) verbunden zu werden.

22. Verfahren nach einem der Ansprüche 18 bis 21, welches ferner die Schritte des Stanzens und Umformens des ersten und zweiten Anschlusses (32, 34) umfasst.

Revendications

1. Connecteur (22) de terminaison électrique pour un câble (20) de transmission de données d'une impédance caractéristique connue et du type ayant un conducteur (26) de transmission de signaux et un blindage (24), le connecteur (22) comportant un sous-ensemble (46) comprenant une première borne (32) agencée pour être couplée électriquement par une de ses extrémités au blindage (24) et ayant un premier contact (36) à son extrémité opposée, une seconde borne (34) agencée pour être couplée électriquement par une de ses extrémités au conducteur (26) de transmission de signaux et ayant un second contact (38) à son extrémité opposée, et un premier insert diélectrique (44) disposé entre les première et seconde bornes (32, 34), et un boîtier (28), le boîtier (28) ayant une région intérieure (52) dimensionnée pour recevoir le sous-ensemble (46) à partir d'une extrémité du boîtier (28) de manière que les premier et second contacts (36, 38) soient accessibles électriquement depuis une extrémité opposée (30) du boîtier (28), des moyens étant prévus pour fixer le sous-ensemble (46) au boîtier (28),
caractérisé en ce que

le sous-ensemble (46) est surmoulé, et **en ce que**
l'insert diélectrique (44) est dimensionné et a une constante diélectrique choisie pour établir une impédance du sous-ensemble (46) qui est sensiblement adaptée à l'impédance caracté-

ristique du câble (20) devant être terminé par le connecteur.

2. Connecteur selon la revendication 1, dans lequel au moins une partie du sous-ensemble (46) est surmoulée en une structure monobloc.

3. Connecteur selon la revendication 1 ou 2, dans lequel l'insert diélectrique (44) comprend un élément du type RT Duroid.

4. Connecteur selon la revendication 1 ou 2, dans lequel l'insert diélectrique (44) comprend une matière céramique.

5. Connecteur selon l'une des revendications 1 à 4, dans lequel les moyens (64) pour fixer le sous-ensemble (46) au boîtier (28) comprennent un époxy.

6. Connecteur selon la revendication 5, dans lequel au moins une partie (58) du sous-ensemble (46) est dimensionnée pour s'ajuster dans la région intérieure (52) du boîtier (28) afin que ladite partie (58) empêche l'écoulement de l'époxy.

7. Connecteur selon l'une des revendications 1 à 6, dans lequel le boîtier (28) comprend des moyens (60) destinés à limiter la profondeur d'introduction du sous-ensemble (46) .

8. Connecteur selon l'une des revendications 1 à 7, dans lequel le câble comporte plusieurs conducteurs (126, 226) de transmission de signaux et le sous-ensemble comporte en outre une troisième borne (234) agencee pour être couplée électriquement par l'une de ses extrémités à un deuxième conducteur (226) de transmission de signaux et ayant un troisième contact à son extrémité opposée.

9. Appareil pour la transmission de données électroniques à travers lui, comportant :

un câble (20) de transmission d'une impédance caractéristique connue, le câble (20) comprenant un conducteur (26) de transmission de signaux et un blindage (24) ; et
un connecteur (22) de terminaison électrique, le connecteur (22) comportant
un sous-ensemble (46) comprenant une première borne (32) couplée électriquement par une extrémité au blindage (24) et ayant un premier contact (36) à son extrémité opposée, une seconde borne (34) couplée électriquement par une extrémité au conducteur (26) de transmission de signaux et ayant un second contact (38) à son extrémité opposée, et un insert diélectrique (44) disposé entre les première et seconde bornes (32, 34) ; et
un boîtier (28), le boîtier (28) ayant une région intérieure (52) dimensionnée pour recevoir le sous-ensemble (46) à partir d'une extrémité du boîtier (28) afin que les premier et second contacts (36, 38) soient accessibles électriquement depuis une extrémité opposée du boîtier (28) ; des moyens (64) pour fixer le sous-ensemble (46) au boîtier (28) ;

caractérisé en ce que

le sous-ensemble est surmoulé et
l'insert diélectrique (44) est dimensionné et présente une constante diélectrique choisie pour établir une impédance du sous-ensemble (46) qui est sensiblement adaptée à l'impédance caractéristique du câble (20).

10. Appareil selon la revendication 9, dans lequel au moins une partie du sous-ensemble (46) est surmoulée en une structure monobloc.

11. Appareil selon la revendication 9 ou 10, dans lequel l'insert diélectrique (44) comprend un élément du type RT Duroid.

12. Appareil selon la revendication 9 ou 10, dans lequel l'insert diélectrique (44) comprend une matière céramique.

13. Appareil selon l'une des revendications 9 à 12, dans lequel les moyens (64) pour fixer le sous-ensemble (46) au boîtier (48) comprennent de l'époxy.

14. Appareil selon la revendication 13, dans lequel au moins une partie (58) du sous-ensemble (46) est dimensionnée pour s'ajuster dans la région intérieure (52) du boîtier (28) afin que ladite partie (58) empêche l'écoulement de l'époxy.

15. Appareil selon la revendication 13, dans lequel l'époxy entoure une région dans laquelle la première borne (32) est couplée électriquement par une extrémité au blindage (24) et dans laquelle la seconde borne (34) est couplée électriquement par une extrémité au conducteur (26) de transmission de signaux.

16. Appareil selon l'une des revendications 9 à 15, dans lequel le boîtier (28) comprend des moyens (60) destinés à limiter la profondeur d'introduction du sous-ensemble (46) .

17. Appareil selon l'une des revendications 9 à 16, dans lequel le câble comporte plusieurs conducteurs (126, 226) de transmission de signaux, le sous-ensemble comportant en outre une troisième borne (234) agencée pour être couplée électriquement

par une extrémité à un deuxième conducteur (226) de transmission de signaux et ayant un troisième contact à son extrémité opposée.

18. Procédé de construction d'un appareil pour la transmission de données électroniques à travers lui, comprenant les étapes qui consistent à se procurer un câble de transmission (20) d'une impédance caractéristique connue, le câble (20) comprenant un conducteur (26) de transmission de signaux et un blindage (24), à coupler électriquement une première borne (32) par l'une de ses extrémités au blindage (24), à coupler électriquement une seconde borne (34) par l'une de ses extrémités au conducteur (26) de transmission de signaux, à introduire un insert diélectrique (44) entre les première et seconde bornes (32, 34), à former un sous-ensemble (46) par surmoulage d'au moins une partie de l'insert diélectrique (44), de l'extrémité de la première borne (32) couplée au blindage (24) et de l'extrémité de la seconde borne (34) couplée au conducteur (26) de transmission de signaux, et à introduire le sous-ensemble (46) dans un boîtier (28),

à fixer le sous-ensemble (46) au boîtier (28) et dimensionner l'insert diélectrique (44) et choisir la constante diélectrique pour établir une impédance du sous-ensemble (46) qui est sensiblement adaptée à l'impédance caractéristique du câble (20).

19. Procédé selon la revendication 18, dans lequel l'étape de fixation du sous-ensemble (46) au boîtier (28) comprend l'étape consistant à distribuer une quantité d'époxy (64) dans la partie extrême intérieure du boîtier (28) .

20. Procédé selon la revendication 18 ou 19, dans lequel le câble comporte plusieurs conducteurs (126, 226) de transmission de signaux, et comprenant en outre l'étape qui consiste à coupler électriquement une troisième borne (34) par l'une de ses extrémités à un deuxième conducteur (226) de transmission de signaux.

21. Procédé selon la revendication 18 ou 19, comprenant en outre l'étape consistant à dénuder le câble (20) afin que le conducteur (26) de transmission de signaux et le blindage (24) soient mis à nu pour être couplés électriquement aux bornes respectives (32, 34).

22. Procédé selon l'une des revendications 18 à 21, comprenant en outre les étapes qui consistent à découper et former les première et seconde bornes (32, 34).

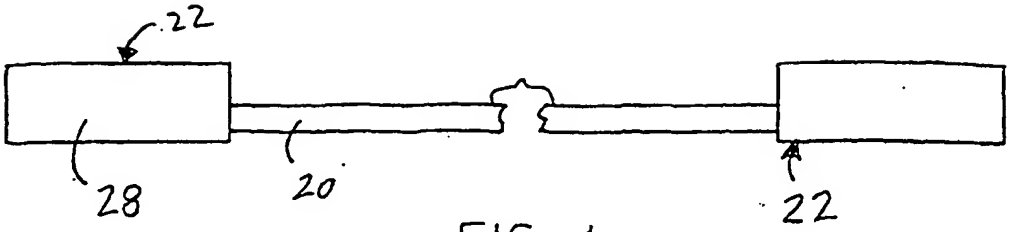

FIG. 1

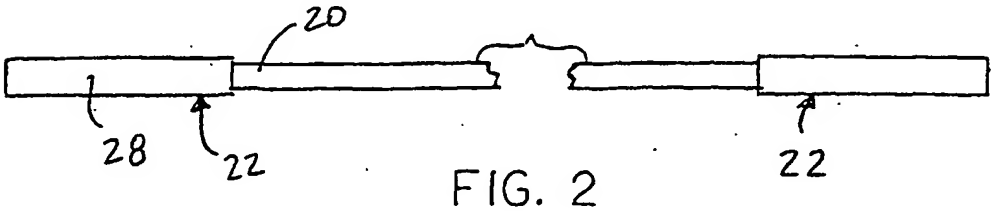

FIG. 2

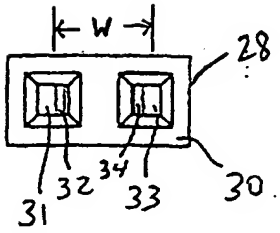

FIG. 4

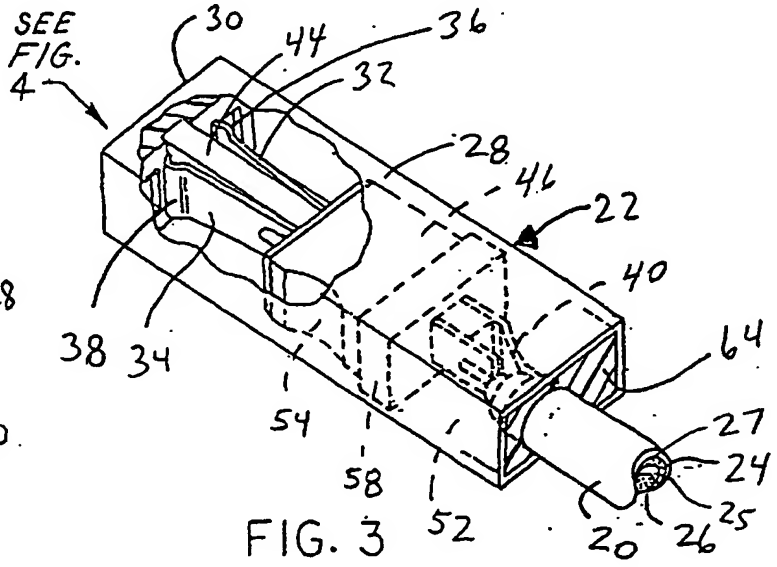

FIG. 3

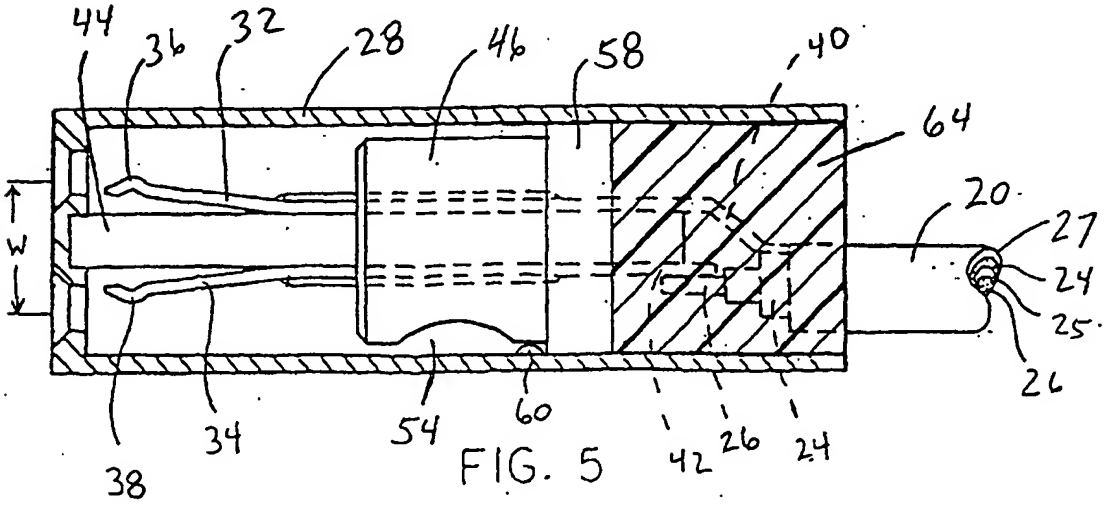

FIG. 5

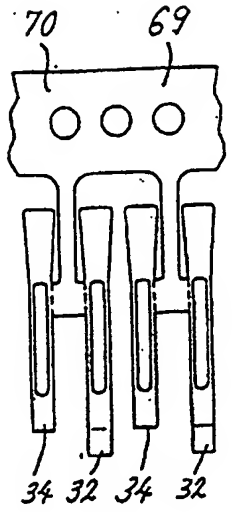

FIG. 6

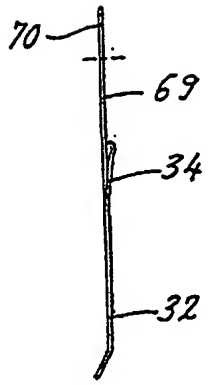

FIG. 7

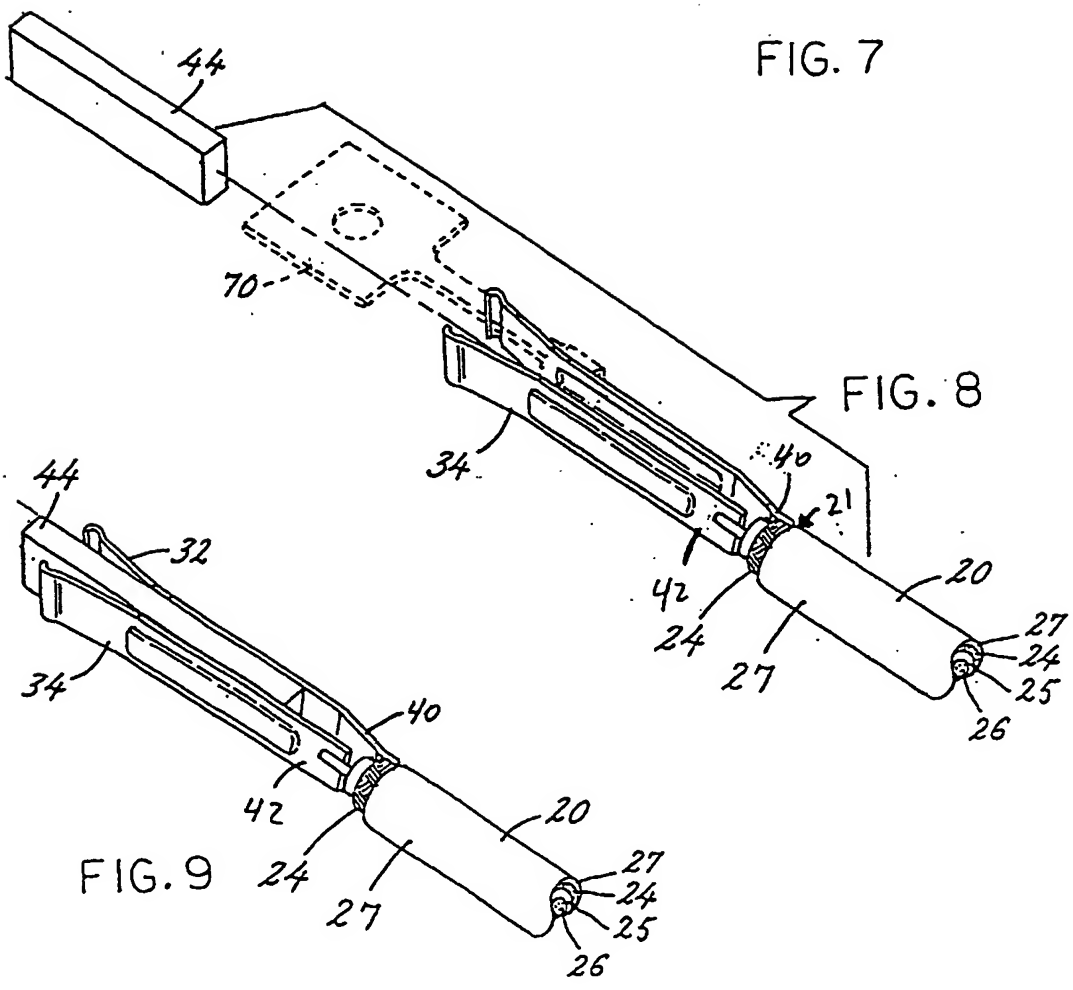

FIG. 8

FIG. 9

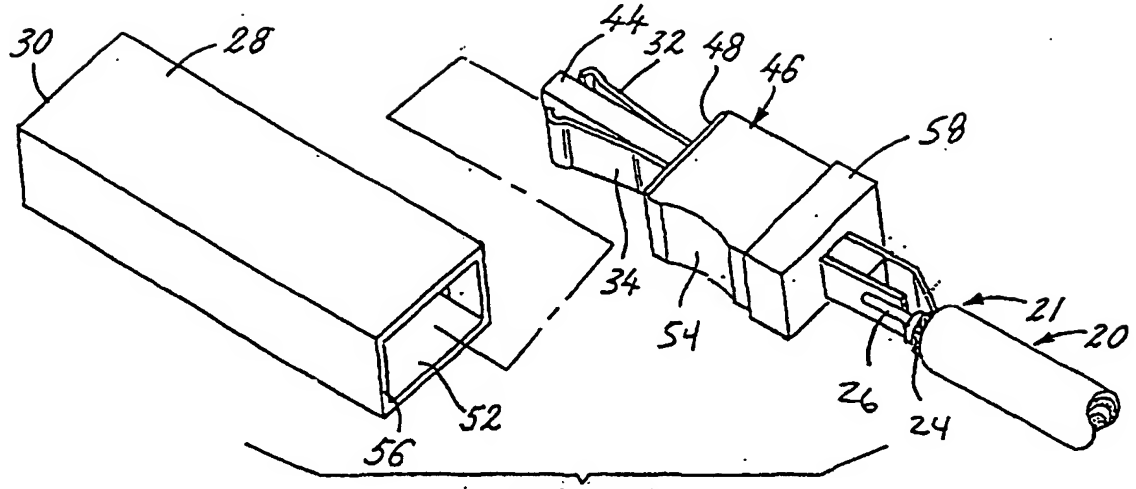

FIG. 10

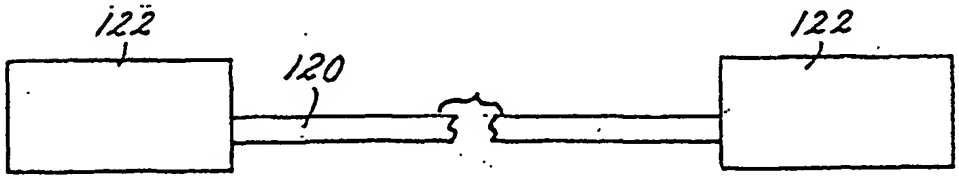

FIG. 11

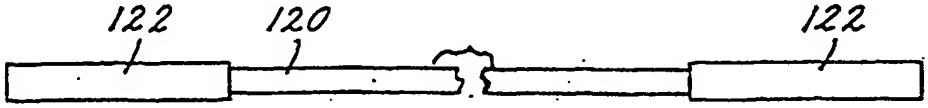

FIG. 12

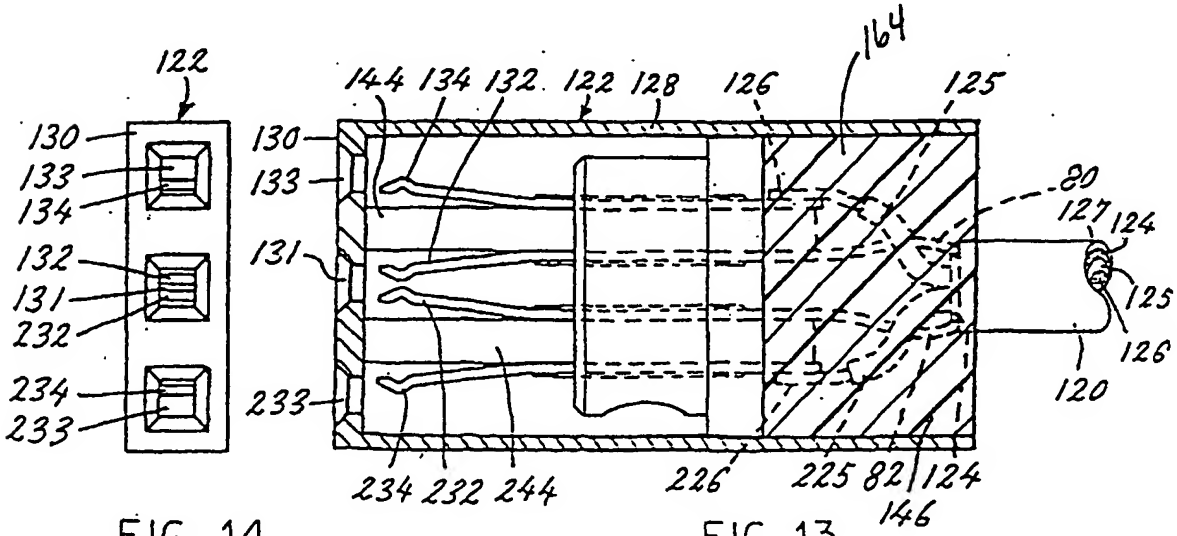

FIG. 14

FIG. 13